REMARKS/ARGUMENTS

Claims 1-14 and 19-21 are active. Claims 15-18 have been withdrawn from consideration. Claims 1 and 21 more precisely describe a neutral atmosphere above the ribbon of glass and a bath of molten metal containing tin. Descriptive support for these claims is found at least on page 4, lines 8-10 of the specification. The oxygen content in new claim 21 also finds support on page 3, lines 1-13 and in original claim 1. No new matter has been added.

Request for Rejoinder

Claims 15-18, to any extent considered to lack unity, should be rejoined and allowed with examined method claim 1 from which they now all depend. These claims were deemed to lack unity on the ground that the special technical feature "comprising at least 30% lead oxide by weight" lacked novelty. However, these method claims have been amended to depend from claim 1 and thus intrinsically share its general inventive concept and unique special technical features, see MPEP 1893.01(d)[1].

Rejection—35 U.S.C. §103(a)

Claims 1, 3, 5-8, 11 and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Speit, U.S. Patent No. 5,073,524, in view of Blackburn, U.S. Patent No. 5,221,646 and further in view of Jeanvoine, et al., U.S. 2002/0162358. This rejection cannot be sustained because none of the references teaches the claimed float glass process where

[1] When making a lack of unity of invention requirement, the examiner must (1) list the different groups of claims and (2) explain why each group lacks unity with each other group (i.e., why there is no single general inventive concept) specifically describing the unique special technical feature in each group.

"floating occurs in a float plant with a neutral gaseous atmosphere ***above the ribbon of glass and bath of molten metal***" as required by the present claims.

Speit cannot teach this because it doesn't teach a float glass process as acknowledged by the Examiner in the 4th and 5th lines from the bottom of page 4 of the OA.

The Examiner has also conceded that Blackburn doesn't teach "that the floating occurs in a float plant with a neutral gaseous atmosphere", OA, p. 5, 2nd full paragraph.

While the last reference applied in this rejection, Jeanvoine, teaches a neutral gaseous atmosphere, it does not disclose use of a neutral gas atmosphere ***over a ribbon of molten glass on a bath of molten metal***. The neutral gas atmosphere in Jeanvoine is imposed in a ***refining device*** and has nothing to do with the ribbon of glass and bath of molten metal required by the claims. Rather, the neutral gaseous atmosphere in Jeanvoine is a feature of a melting and refining device that is used ***before*** the melted glass is floated on a bath of molten metal. This is apparent from the Jeanvoine disclosure and figures as explained below.

The refining device disclosed by Jeanvoine, which is used ***before*** the floating of glass on a bath of molten metal, contains molybdenum tubes. Molybdenum is used because it is inert to contact with molten glass. However, molybdenum is quite susceptible to oxidation. Jeanvoine recognizes this and indicates that when the molybdenum tubes are not covered by molten glass (thus protecting them from oxidation by contact with air), that a non-oxidizing atmosphere should be provided to protect the tubes from oxidation in the refining device, see paragraphs [0110] and [0111] of Jeanvoine.

Paragraph [0111] states "to provide a non-oxidizing atmosphere above the melt (especially an N2 atmosphere). The two tubes 50 emerge in a collector tube 55 which feeds the discharge orifice 8 of the chamber". This section discloses a particular part of the glass refining device where the glass is melted by burners and then discharged in a molten state by an orifice of the refining chamber. This section does not describe a ribbon of molten glass

riding on a bath of molten metal as required by the claimed float glass process. One of ordinary skill in the art would have found no motivation to use a neutral gas atmosphere in a subsequent float glass process which doesn't contain the molybdenum tubes of the melting and refining device of Jeanvoine.

As mentioned above, the written disclosure of Jeanvoine corresponds to the figures in Jeanvoine which show that after movement through the glass melting and refining device of Jeanvoine (containing the oxidixable molybdenum tubes) that the molten glass is discharged in air, see the portions of Figs. 1, 2 and 3 shown below:

Fig 1:

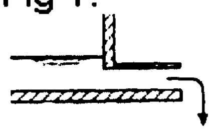


Fig 2:

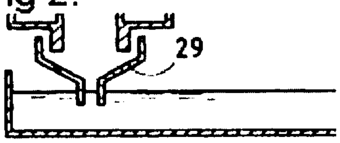


Fig 3:

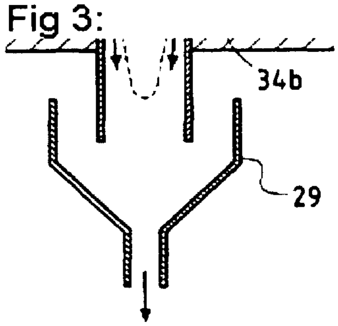
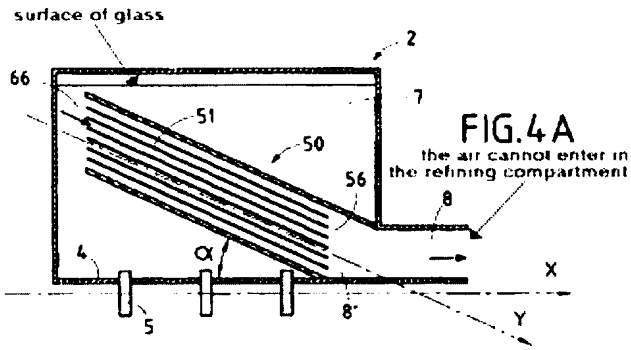


Fig. 4A also depicts this when describing the refiner containing the molybdenum tubes (50) which are submerged below the surface of the molten glass.



Alternatively, if the tubes (50) were not completely submerged by the molten glass, a neutral atmosphere could be imposed above the surface of the molten glass. What is apparent from Fig. 4A is that the atmosphere above the refining tubes (50) is not in communication with any devices to which the refiner is attached.

Reference number (5) in Fig. 4A depicts a submerged burner and according to paragraph [0037] of Jeanvoine the device produces a "foam" of glass which is refined to "condition the molten glass thermally and chemically and in eliminating therefrom any batch stone, **bubbles** or any cause of defects appearing after forming', see paragraph [0003]. The glass melted by burners (5) in the Jeanvoine melting and refining device contains a high amount of gas and the device is designed to remove these bubbles that contain oxidizing gases like and H_2O and SO_3 produced by the submerged burners. As clear from Fig. 4A, these gases would accumulate above the molten glass. As noted above, the atmosphere above the molten glass is not in communication with any subsequent float glass device. Moreover, it would be nonsense to introduce these gases into a later stage where glass is floated on a bath of molten metal.

Even if the atmosphere above the molten glass in the Jeanvoine refining device is conflated with the atmosphere used in the claimed float glass process, this atmosphere could

not be the neutral gaseous atmosphere required by the invention. Jeanvoine describes in paragraph [0111] the alternative of imposing a non-oxidizing atmosphere in the melting and refining device, the proposed protective atmosphere would be compatible with the usual reducing atmosphere of float glass installations, ***if the oxidizing gases produced by the submerged burners were to be neutralized***. That is, if a neutral gaseous atmosphere were used, it would quickly become an oxidizing atmosphere due to the gases incorporated from the burners. This is in stark contrast to the invention which expressly avoids a reducing atmosphere because it produces undesirable lead condensation which fouls the float glass produced. Consequently, one of ordinary skill in the art would have had no reason to replace the usual reducing atmosphere of a conventional float glass process as described on page 1, lines 15-20 of the specification with a neutral atmosphere. This rejection cannot be sustained, because none of the references alone or in combination suggest a process where "floating occurs in a float plant with a **neutral gaseous atmosphere** ***above the ribbon of glass and bath of molten metal***" nor does the prior art provide a reasonable expectation of success for solving the problems of making lead-rich glass by the float process as described in the specification.

<u>Rejection—35 U.S.C. §103(a)</u>

Claim 8 was rejected under 35 U.S.C. §103(a) as being unpatentable over <u>Speit</u>, U.S. Patent No. 5,073,524, in view of <u>Blackburn</u>, U.S. Patent No. 5,221,646 and further in view of <u>Jeanvoine, et al.</u>, U.S. 2002/0162358 and further in view of <u>Shelby</u>, *Lead Galliate Glasses*. None of the three primary references teaches a process where "floating occurs in a float plant with a neutral gaseous atmosphere ***above the ribbon of glass and bath of molten metal***". Shelby does disclose this either, thus none of the references disclose or suggest all the limitations of claim 8.

Moreover, while Shelby teaches a lead-rich glass containing 60 wt.% lead oxide, claim 8 is a process claim and Shelby and the other references do not suggest how to make a lead-rich glass according to the invention or how to solve the problem of formation of a grayish film the inevitably forms on the surface of lead-rich float glass, see the bottom of page 2 of the specification. Shelby was cited merely to show that the prior art recognized that glasses containing 60 wt.% lead oxide existed. The Examiner theorizes that one of ordinary skill in the art would have sought to simply use the method of Blackburn to make lead rich glass containing 60% by weight. As discussed above, Blackburn does not disclose or suggest any method for making glasses containing more than about 25 wt.% lead oxide and the art recognized significant problems with use of the float glass process for high density lead glasses as disclosed on pages 1-2 of the specification.

Rejection—35 U.S.C. §103(a)

Claim 4 was rejected under 35 U.S.C. §103(a) as being unpatentable over Speit, U.S. Patent No. 5,073,524, in view of Blackburn, U.S. Patent No. 5,221,646 and further in view of Hiromatsu, et al., U.S. 2005/0028559 and further in view of Gardner, U.S. Patent No. 5,120,579. The three primary references have been addressed above. None of the primary references teaches a process where "floating occurs in a float plant with a neutral gaseous atmosphere ***above the ribbon of glass and bath of molten metal***". Hiromatsu and Gardner were relied upon for teaching the relative glass transition temperature points of lead-free and lead rich glass, but do not teach a process where "floating occurs in a float plant with a neutral gaseous atmosphere above the ribbon of glass and bath of molten metal". Moreover, Hiromatsu is directed to a process using a reducing atmosphere—see paragraph [0004] and Gardner is directed to a process of firing a dielectric composition in "oxidizing atmospheres", see col. 1, lines 50-52. Thus, one with ordinary skill in the art would have found no guidance

in these references for using a neutral atmosphere for producing a lead-rich glass. Therefore, this rejection cannot be sustained.

Rejection—35 U.S.C. §103(a)

Claims 5, 9, 10 and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Speit, U.S. Patent No. 5,073,524, in view of Blackburn, U.S. Patent No. 5,221,646 and further in view of Jeanvoine, et al., U.S. 2002/0162358 and further in view of Brichard, U.S. Patent No. 3,801,412 and Direct Scientific, *LX-57B Lead Glass for Radiation Shielding.* The three primary references have been addressed above. None of the primary references teaches a process where "floating occurs in a float plant with a neutral gaseous atmosphere ***above the ribbon of glass and bath of molten metal***". Brichard and Direct Scientific also fail to disclose or suggest such a process.

Brichard was relied upon for teaching floating glass at a temperature ranging from 500-800°C and for maintaining a neutral and/protective atmosphere, col. 1, lines 14-21:

> **In the manufacture and/or conditioning of flat glass on a bath of molten material, it is known to maintain a generally neutral and/or protective atmosphere inside the tank. In this way active elements such as oxygen are prevented from entering into chemical reaction with the molten material to form compounds liable to form agents which would contaminate the glass or spoil the surface quality of the sheet or ribbon.**

Brichard does not teach float glass containing at last 30 wt.% lead oxide nor did he recognize the advantages of using a neutral gaseous atmosphere that may contain small amounts of oxygen instead of one containing a reductive gas, like hydrogen--see col. 11, lines 24-30 which describe a protective gas mixture containing nitrogen and 5% hydrogen.

> **Before the tank 14 is filled with molten metal, it is flushed through with a protective gas, e.g. a gas mixture consisting 95 percent by weight of nitrogen and 5 percent by weight of hydrogen. When the tank is filled with the protective gas and all of the air has been expelled, molten metal is introduced into the tank, or a charge of metal already present in the tank is melted. The tank is then thermally conditioned by thermal conditioning means (not shown) such as electrical resistance heaters.**

Brichard cannot provide a reasonable expectation of success for the invention which avoids the grayish film (of metallic lead) that inevitably forms when a reductive atmosphere is used with a lead rich glass, see the paragraph bridging pages 2-3 of the specification because it expressly teaches use of a reductive atmosphere, such as the one described above containing 5% hydrogen. Moreover, Brichard is not directed to production of lead-rich glass, does not recognize the problems associated with the production of lead-rich glass such as those disclosed at the bottom of page 2 of the specification, and cannot suggest how to solve these problems.

Direct Scientific was relied upon for teaching "a lead oxide glass comprising at least 55 percent lead oxide", but fails to disclose or suggest limitations missing from the primary references or from Brichard. That is while Brichard teaches lead-rich glass containing 55% lead oxide, it does not disclose or suggest a process for making lead-rich glass that solves the problems described at the bottom of page 2 of the specification. Like the other references, it does not disclose or suggest a process where "floating occurs in a float plant with a neutral gaseous atmosphere ***above the ribbon of glass and bath of molten metal***". Therefore, this rejection cannot be sustained.

Rejection—35 U.S.C. §103(a)

Claims 12-14 were rejected under 35 U.S.C. §103(a) as being unpatentable over Speit, U.S. Patent No. 5,073,524, in view of Blackburn, U.S. Patent No. 5,221,646 and further in view of Jeanvoine, et al., U.S. 2002/0162358 as applied to claims 1-3, 5-8, 11 and 19; and further in view of Maugendre,WO03/045859 (equiv. to U.S. 7,428,827). The three primary references have been addressed above. None of the primary references teach a process where "floating occurs in a float plant with a neutral gaseous atmosphere ***above the ribbon of glass and bath of molten metal***". Maugendre doesn't teach this either and was relied upon for teaching a float plant which includes a furnace with *two components*. However, Maugendre cannot remedy the deficiencies of the primary references, and furthermore, fails to teach "the second tank being fed with lead oxide" as required by claims 12-14 (see OA, line 3 from bottom of page 10). Therefore, the references in combination do not teach all the limitations of the rejected claims and this rejection cannot be sustained.

Conclusion

This application presents allowable subject matter and the Examiner is respectfully requested to pass it to issue. The Examiner is kindly invited to contact the undersigned should a further discussion of the issues or claims be helpful.

Respectfully submitted,

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